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Reframing energy performance requirements in building standards

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Abstract

It is difficult to find dissent from the proposition that it is desirable to reduce the energy required to keep buildings warm. However, translating this proposition into material investment in retrofitting existing buildings and raising minimum standards for new buildings is challenging given both the range of social interests impacted by implementation (building owners, occupants, utility companies, future generations, developers, etc.) and the fact that the financial benefits of energy saving are predicated on a counterfactual analysis and accrue over many years. Regulation of the energy performance of buildings, both newly constructed and renovated, is thus an area with much scope for contestation. In an attempt to establish a common approach, the European Commission (as part of the 2010 recast of the Energy Performance of Buildings Directive) required member states to calculate “cost optimal” building standards, meaning the standards for which the combined (discounted) costs of energy efficiency measures and resulting energy demand over a thirty year period would be minimised. As costs of measures and energy vary across states, as do climatic conditions and the characteristics of the building stock, the Commissions methodology allowed that the “cost optimal” standard would be different in different states. In this paper I discuss the reports submitted by three states (the UK, Denmark and Germany) to the Commission, and argue that, far from the methodology establishing a common baseline it afforded considerable flexibility for states to present quite different analyses. To the extent these analyses justified building standards already in place they reflect the (temporarily settled) outcome of negotiation among various interests, but in their selection of appropriate calculative techniques they also illustrate broader energy policy paradigms in each country. In particular I argue that the meaning (and not just the parameters) of “cost optimality” in the three countries is linked to dominant policy visions of the role of markets in determining outcomes and the range of supply-side futures entertained by policymakers.

1 Introduction

Chiapello (2014) draws attention to the growth of *financialised* policy making: increasingly across a range of policy domains decision making is being driven by procedures drawn from financial economics and mathematical finance. Chiapello is concerned that financialised valuation marginalises alternative approaches to calculation or valuation, and risks “a loss of freedom and meaning” (p. 15). One

important conduit for the promotion of financialised valuation is the European Union which, Chiapello (2014) suggests, is in the vanguard of this development.

In this paper I analyse one example of EU-directed financialisation of governance. The example concerns regulatory standards for energy efficiency of buildings, and the form of financialised governance stipulated is the calculation of “cost-optimal” (in Net Present Value terms) levels of energy efficiency. My analysis is geared to exploring the discretion afforded to Member States in compliance with required financialised procedures, and thereby to understanding the extent to which freedom (of national governments) to construct energy demand in different ways is maintained.

The paper is structured as follows. Section 2 describes the calculations required by the EU for states to assess “cost-optimal” levels of energy efficiency. Section 3 examines how three states, Denmark, Germany and the UK, took different approaches to these calculations. Calculative differences are found to significantly shape the outcomes, with the UK’s approach leading to lower energy efficiency standards than the Danish and German approaches. Section 4 explores factors shaping calculative procedures in each country, and suggests in conclusion that differences are not *post hoc* rationalisations of standards adopted for different reasons, but reflect different *evaluation cultures* (c.f. MacKenzie and Spears, 2014).

2 The 2010 EU Energy Performance of Buildings Directive (EPBD)

The EPBD¹ contains a variety of measures designed to promote energy efficiency in buildings. Several of these focus on minimum standards set out in building regulations, applicable to new buildings and existing buildings undergoing renovation. The directive does not prescribe particular standards, but requires Member States (MSs) to:

calculate cost-optimal levels of minimum energy performance requirements using the comparative methodology framework established [by the EU Commission] and relevant parameters, such as climatic conditions and the practical accessibility of energy infrastructure, and com-

¹The 2010 Energy Performance of Buildings Directive is actually a “recast” of a 2003 directive.

pare the results of this calculation with the minimum energy performance requirements in force. (EPBD Article 5, paragraph 2.)

Where regulated minimum performance standards are less efficient than the cost optimal, and the MS is unable to offer an adequate justification for the gap, the directive requires it take steps to bring regulation into line with the calculated optimal.

2.1 European Commission methodology for calculating cost optimal energy efficiency

The methodology by which Member States were to calculate cost optimal levels was published two years later in 2012. It used a form of Cost-Benefit Analysis (CBA) and set out what costs and benefits were to be appraised. These included capital costs of measures, maintenance costs, costs of energy, carbon emissions (expressed in monetary terms), and residual value of equipment at the end of the calculation period. The methodology also prescribed how energy performance was to be expressed, as modelled primary energy demand divided by floor area. The methodology also set out a range of other factors not explored in this paper (such as the selection of reference building types).

MSs were to identify a range of possible energy efficiency standards by modelling different packages of technology (principally fabric insulation, microgeneration). For each package the primary energy demand was to be calculated using each MSs approach to building physics modelling. The “global cost” of each package could then be calculated as the Net Present Value of costs and benefits over a thirty year period. Broadly put, the “cost optimal” energy efficiency level would be that corresponding to the package of measures with the lowest global cost, which the commission illustrated this graphically (figure 1).

However, while the commission stipulated a range of costs and benefits to be included in the analysis, it left several key aspects of the methodology to MSs discretion. In particular *two* CBA perspectives were described: a microeconomic perspective reflecting “the limitations to the investor” (European Commission, 2012, p. 15) and a macroeconomic perspective which “encompass[es] a broader public good perspective” (p. 14). The two approaches represent costs in any given year (i.e. before a discount factor is applied) in different ways. Taxes and subsidies are generally included in microeconomic analyses and excluded from macroeco-

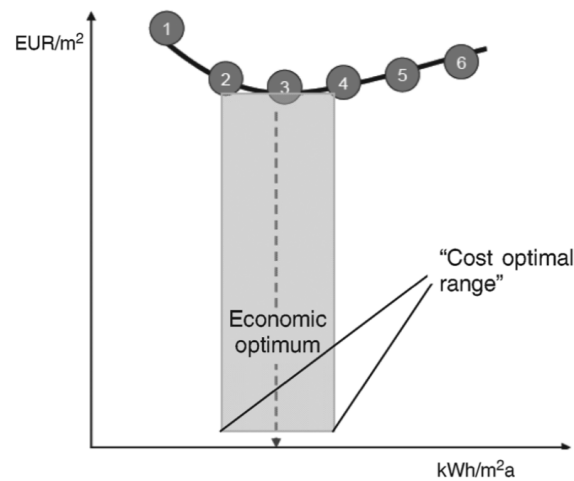


Figure 1: Illustration of cost optimal energy efficiency levels. (From European Commission, 2012, figure 5.)

nomic analysis, the underlying theory of CBA treating taxes as financial transfers between groups in society rather than as using up the economic resources available to a society. For energy the micro/macro distinction can become more complicated as certain non-tax costs incurred across a society, such as the costs of maintaining network infrastructure, are considered not to change with reduced levels of demand (see e.g. DECC, 2015). However, the way these costs are apportioned may be related to different levels of demand (for example, large users may pay a higher charge for network maintenance). A building with reduced energy demand may consequently incur a lower share of overall energy system costs without those overall costs falling to the same extent. (The difference may simply be passed on to other users in the form of higher energy tariffs).

MSs were required to calculate global costs from *both* micro- and macroeconomic perspectives, but were free to chose which one to use in determining their cost optimal level. In addition, while the Commission offered some comments on the appropriate discount rate to use, this was also left to MS discretion.

These degrees of freedom are significant to the CBA appraisal of energy efficiency technologies. Energy savings typically accrue over a long period (the commission required calculations to cover 30 years), so seemingly small differences in a discount rate can have considerable impact on their net present value (roughly, because of the infamous power of compound interest). Lower discount rates will, *ceteris paribus*, tend to increase the value of energy savings. The choice between micro and macroeconomic analysis can also have a significant impact. Inclusion of both taxes and non-variable energy costs lead to “the cost” of energy being

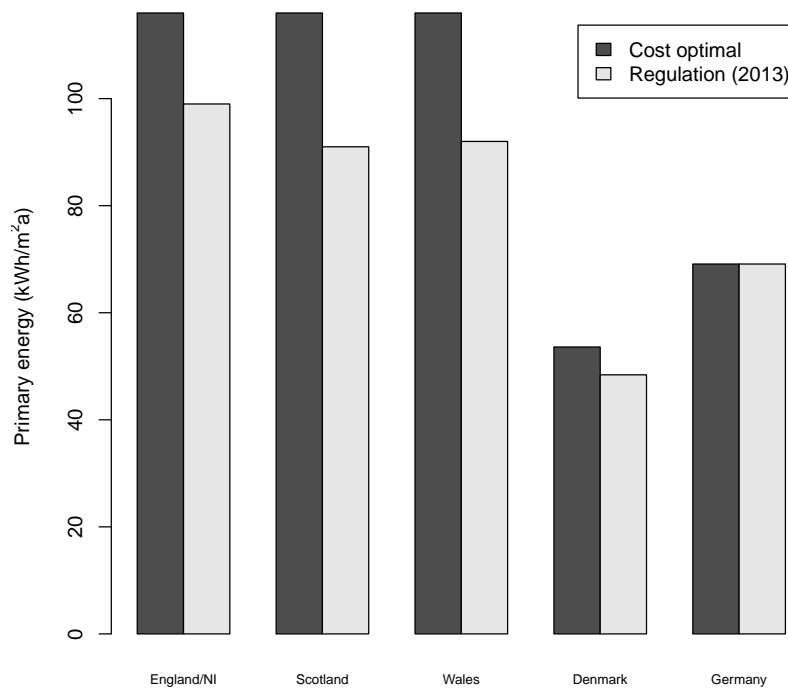


Figure 2: Comparison of cost optimal and regulated energy performance levels for multi-dwelling buildings.

represented as higher in microeconomic analyses than macro. The higher the cost of energy represented in a CBA, the greater the relative value of energy savings.

3 Cost optimal energy efficiency levels in the UK, Denmark and Germany

Figure 2 shows the calculated cost optimal performance levels for new build flats across the UK nations, Denmark and Germany (calculations for single-family houses showed a similar pattern). The figure also shows the regulated standards each MS reported to the commission. All three states found their regulations in force met or exceeded the cost optimal level (so avoiding having to justify or change regulations to comply with the directive). However, in spite of the UK's

slightly warmer climate² the UK calculated cost optimal levels to be higher than Denmark or Germany.

3.1 Different analytical perspectives

Why was this? The three countries drew on their own data for variables such as prices for energy and efficiency measures, climate, architectural styles, and for standard building physics modelling. These differences are important to differences between the countries' results, but here I focus on differences in how they were combined in each country's CBA. In particular, UK cost-optimality was derived from macroeconomic calculations whereas Denmark and Germany used a microeconomic approach. As the Commission required states report *both* approaches it is straightforward to examine the impact of these choices.

Figure 3 shows Danish global costs calculated from both micro- and macroeconomic perspectives for a range of packages (in this case, retrofitted to a 1960s house³). The microeconomic packages produce a curve similar to that envisaged by the commission (figure 1) with a minimum in the region of 120 kWh/m²a. However, from a macroeconomic perspective overall costs were calculated to be considerably lower at less exacting standards. Had the cost optimum been based on a macroeconomic calculation the corresponding demand would have been 270 kWh/m²a — more than twice as high.

The Danish analysis used a discount rate of 3%/year for both macro- and microeconomic analysis, meaning the impact of the time-discounting was the same in both approaches. The principal difference between the two perspectives is the costs represented in each. For example, the Danish microeconomic analysis represents electricity costs as being on average 2.9 times higher than from a macroeconomic perspective. One aspect of this difference is the inclusion of taxes. Denmark levies energy taxes at considerably higher rates than most other European countries⁴ so efficiency packages that save energy also save tax. Furthermore, Danish energy taxes *include* a CO₂ tax (alongside other charges), so the inclusion

²According to Eurostat (table [nrg.esdgr_a]) the UK on average has 3,100 heating degree days per year while Germany and Denmark have 3,200 and 3,500 respectively.

³N.B. figure 2 shows cost optimal levels for *new* buildings. This is why the energy demand for the packages considered in figure 3 are considerably higher.

⁴Energy taxes account for around 4% of overall Danish tax income http://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=REVDNK&ShowOnWeb=true&Lang=en

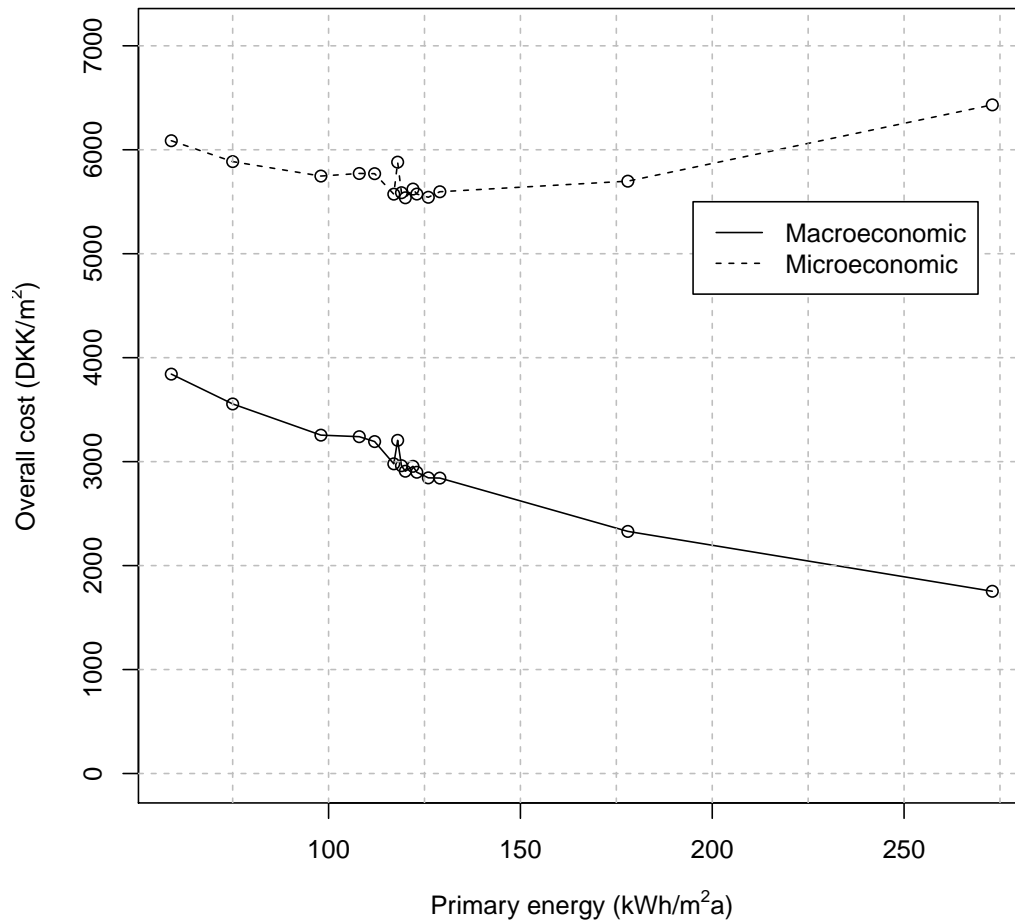


Figure 3: Danish cost optimal calculations for a 1960s single-family house retrofit (using a heat pump)

of greenhouse gasses in the macroeconomic analysis does not represent an additional cost excluded from the microeconomic approach.

The UK macroeconomic approach to cost optimality drew on⁵ guidance set out by the UK Treasury and UK Department of Energy and Climate Change (DECC) for appraising policy options. The analysis used the government's standard 3.5% discount rate (HM Treasury, 2003), higher than both the Danish *microeconomic* discount rate and the rate required by the Commission for sensitivity analysis (3%). Figure 4 shows the result of this calculation (solid line). In common with the

⁵The Commission set minimum greenhouse gas costs to be used in macroeconomic analysis which were generally lower than those recommended by DECC (2009, 2015). While the UK analysis included UK carbon costs in its sensitivity analysis it was the lower Commission costs that were used in the core cost optimality calculations.

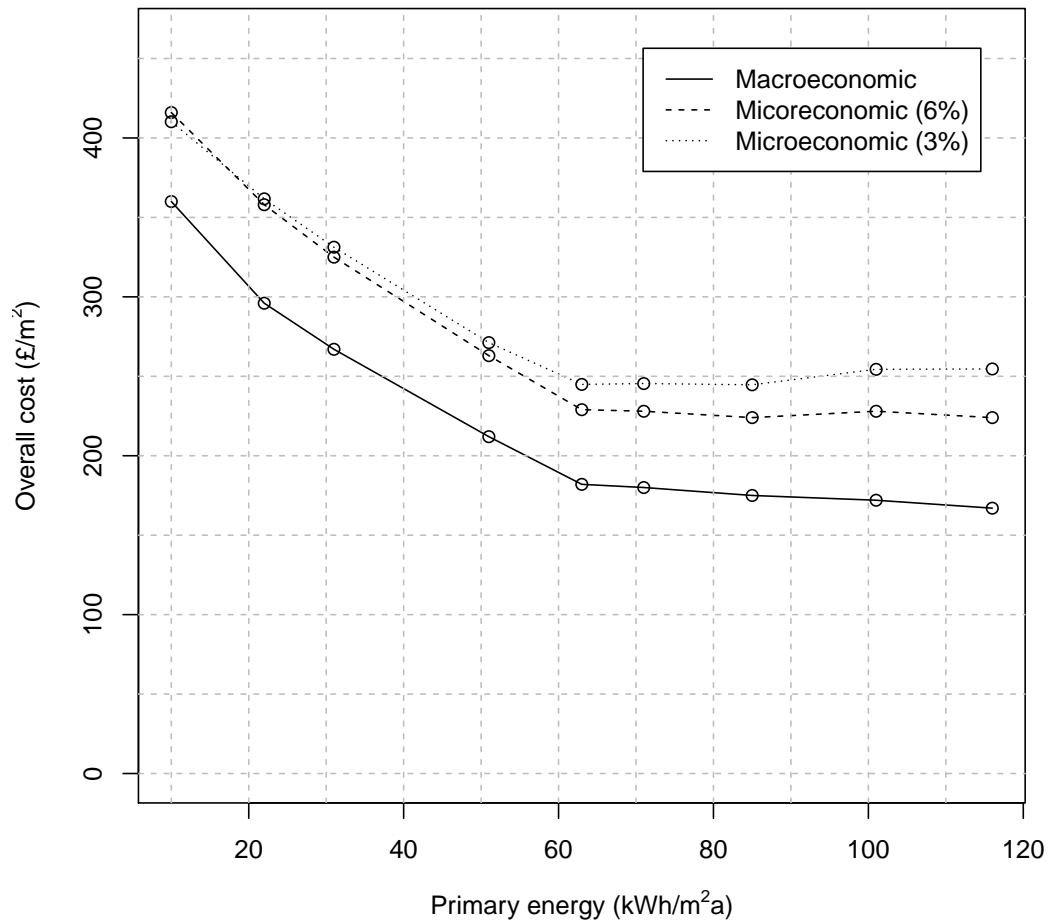


Figure 4: UK cost calculations for different energy performance levels for a new-build mid-floor flat

Danish analysis in figure 3, the least efficient package showed the lowest global cost in the macroeconomic analysis, and in the UK case this was the reason for identifying this level of energy performance as “cost-optimal”.

What would have happened if the UK had based “cost-optimality” on a microeconomic analysis? The difference in the represented value of energy savings each year is not as significant as in the Danish case because the UK has a lower tax rate (5% for domestic energy supply). The exclusion of carbon costs from the microeconomic analysis, unlike the Danish case, is not compensated for by a carbon tax.⁶ Nonetheless, microeconomic energy costs used in the UK analysis were

⁶Indeed, Advani et al. (2013) argue that because VAT on domestic energy is below the standard VAT rate domestic gas includes an implicit carbon subsidy of £19/tCO₂

considerably higher than macroeconomic costs (e.g. by a factor of 1.9 for fossil gas). However, when presenting a microeconomic analysis the UK used a higher discount rate of 6%. This partially offset the additional value of energy savings from a microeconomic perspective (dashed line, figure 4), though on this analysis the global costs were quite similar for packages down to around 60 kWh/m²a (i.e. down to the levels Germany and Denmark calculated as optimal, figure 2). Had the UK used Denmark's 3% microeconomic discount rate (dotted line, figure 4) a clearer cost minimum in the range 60–85 kWh/m²a would have been found.

Germany, like Denmark, based its definition of cost-optimal on micro-economic analysis. However, differences in energy costs between the two perspectives were small compared with UK and Danish differences (German microeconomic costs around a third higher than macroeconomic for non-electricity energy vectors). The German analysis differentiated micro- and macroeconomic energy costs only by inclusion/exclusion of taxes (i.e. the notion of non-variable costs was not used, Buildings Performance Institute Europe, 2013). The similarity of energy costs across the two perspectives, coupled with similar discount rates (3.5% micro-, 3% macro-) meant the optimality calculations were broadly similar across perspectives. For new buildings both perspectives found the same performance standards to be cost-optimal (and these were also the regulatory standards in force at the time).

3.2 Different approaches to sensitivity

The EU Commission's guidance required that:

if packages have the same or very similar costs, the package with the lower primary energy use (= left border of the cost-optimal range) should if possible guide the definition of the cost-optimum level. (European Commission, 2012, p. 25, "left border" refers to packages represented in the format of figure 1)

The operationalisation of "very similar costs" was left to MSs discretion. The UK reported a range of efficiency levels for new buildings for which the global cost was within 5% of the lowest cost package (though stuck with the least cost package as the "cost-optimal"). The corresponding German analysis used a cost range of 2%. While this gives the impression that the UK analysis was more willing to countenance higher-cost packages, the analyses represented upfront

costs in different ways. In the UK analysis the capital cost of energy efficiency was represented as the *additional* cost implied by a package compared to constructing a building at a basic efficiency level. In Germany the whole cost of construction was included. That is, whereas the UK examined the costs of making a building energy efficient, the German analysis examined the costs of making an energy efficient building.

German costs for new buildings were estimated around €800/m² for flats and €1200/m² for semi-detached homes. Were costs of this order of magnitude to be included in the UK analysis, the 5% range for *additional* costs would correspond to about 1% of *total* costs. In this respect the UK's sensitivity analysis was relatively conservative.

The German and UK reports also conducted sensitivity analyses by varying calculation parameters. For new buildings the UK report examined three additional scenarios: low and high energy prices, and different discount rates (3% for macroeconomic analysis, as required by the EU Commission, and 10% for microeconomic analysis). The German report explored just one additional scenario in which assumed energy prices were higher and discount rates used were lower (0% for macro- and 1.3% for microeconomic analysis). The German sensitivity analysis specifically examined conditions under which cost-optimal levels were likely to be more energy efficient, and indeed this was what the analysis found. For example, the basic calculation for a semi-detached house had found the cost-optimal level to be 74 kWh/m²a whereas under the sensitivity scenario this fell to 63 kWh/m²a on a microeconomic analysis and just 35 kWh/m²a on a macroeconomic analysis.⁷ These levels were well below German building standards in force at the time, a point the German report highlighted.

The UK sensitivity analysis can be read as exploring the space around the cost-optimal calculation, in contrast with the German report's exploration of the most efficient levels that could be considered cost-optimal. The UK analysis nonetheless did include scenarios under which the lowest cost package was considerably more efficient than the basic calculation,⁸ a result the report did not draw attention to. Indeed, the UK report stated:

⁷The macroeconomic calculation produced a lower cost optimal than the microeconomic analysis in spite of energy costs being represented as lower because of the zero discount rate applied.

⁸For mid-floor flats, a microeconomic analysis with a discount rate of 6% and high energy prices found the lowest cost efficiency level to be 78kWh/m²a (table 5.4c). This was lower than both the 116kWh/m²a found as optimal by the basic calculation and the regulated levels in force at the time which ranged from 91kWh/m²a in Scotland to 99kWh/m²a in England.

It is worth also reviewing the uncertainty shown in the sensitivity results. Even if the minimum in the range for each reference building was taken, the current technical standards would be close to or better than the cost optimal levels. (p. 67)

4 Discussion

The Energy Performance of Buildings Directive contributes to the financialisation of policy making in the sense discussed by Chiapello (2014). However, although the Commission both required energy efficiency regulations to be judged through CBA and went some way to constrain how MSs conducted these calculations, its guidance left considerable scope for discretion. As the calculations reviewed in this paper demonstrate this discretion was consequential. Differences in what the UK, Denmark and Germany reported as cost-optimal energy performance standards do not reduce to differences in local material conditions (such as climate or architectural styles), nor to local market conditions (such as energy prices). In addition to these factors, I have shown that differences in calculation techniques significantly shaped what each state reported to be cost-optimal. I suggest that these differences are *arbitrary* in the sense that there is no legitimate standard of correctness against which different approaches may be judged. Indeed, this is highlighted by the fact that each is compatible with the EU Commission's guidance, which itself acknowledges that different approaches "have a specific rationale and inform on different issues" (European Commission, 2012, p. 14).

An overall pattern emerges from the contrast between the UK on the one hand and Denmark and Germany on the other. For the following reasons the German and Danish analyses tend toward lower demand levels being deemed optimal than the UK approach:

- The UK used macroeconomic calculations in which the representation of energy costs (and hence the value of energy savings) are low relative to a microeconomic calculation.
- When conducting microeconomic analysis energy costs are discounted in the UK at a relatively high rate (6% compared with Denmark's 3% and Germany's 3.5%).
- The UK's operationalisation of "the same or very similar" costs for packages more efficient than the lowest cost package is relatively conservative.

- The UK used sensitivity analysis to explore the space around the core calculation, including low energy price scenarios which would tend to make the cost-optimal less energy efficient. By contrast Germany examined only one alternative scenario whose parameters tended to make the cost-optimal level more energy efficient.

4.1 Approaches to cost optimality as embedded in broader energy policies

If the choice of calculation method shaped outcomes, why did the countries select the methods they did? Here I want to explore the relationship between the energy performance of buildings and broader energy policy issues. I do this not to suggest that the three governments intentionally selected approaches on the basis of the outcomes they produced. Rather, I suggest that different calculative approaches reflect different meanings of “cost-optimal” energy efficiency embedded in broader energy policy styles, and the methods used in reporting under the EPBD draw on calculative approaches already established in each state.

The options countenanced by energy policy makers for energy supply are more constrained in Germany and Denmark than the UK. The German *Energiewende* is oriented to achieving significant reductions in CO₂ emissions *and* phasing out nuclear power (Huß, 2014). Exploration of Carbon Capture and Sequestration (CCS) proved controversial (Geels et al., 2016) and the technology is now not included in the German Government’s future energy scenario analyses. These instead focus on renewable energy supply (BMW, 2014). Danish scenarios similarly do not envisage nuclear power or CCS, instead setting targets for 100% renewable energy (by 2035 for heating and electricity generation, and by 2050 for all applications, Danish Government, 2013). By contrast UK policy is broadly constructed around three potential pathways (nuclear, CCS and renewables, HM Government, 2011), each of which is (ostensibly) being kept open as a possibility.

The range of high-level energy supply options considered is consequential for the specificity of long-term targets for energy efficiency. Among the targets articulated in German policy, fossil fuel used as a primary energy source for buildings is planned to reduce by 80% by 2050 against a 2005-08 baseline (DENA, 2015). In principle this could be achieved by some combination of reducing final energy demand (energy efficiency) and replacing fossil fuels with renewable energy.

Consultancy analysis for the Federal government has found that limits to feasible levels of both renewable energy and energy efficiency translate the 80% target into a very narrow range of possibilities: virtually the full technical potential for energy demand reduction through improving the fabric would be required (personal communication with the consultants). Similarly, Danish energy efficiency targets (35% reduction in buildings heat demand) are set by reference to what is considered feasible rather than optimal (Danish Government, 2014).

The variety of energy supply technologies envisaged in UK energy scenarios corresponds to a variety of energy efficiency outcomes. Constraints on renewable production potential are less pressing if nuclear and CCS are also assumed to be available. This is reflected in UK Government energy system-wide cost-optimisation modelling which find the degree of demand reduction required by 2050 greenhouse gas targets is dependent on production technologies: a nuclear-oriented scenario corresponds to 31% demand reduction whereas a renewables-oriented scenario corresponds to 54% reduction (DECC, 2012).⁹

In addition to differences in how constrained long-term energy efficiency visions are, UK policy makers differ from their German and Danish counterparts in how near-term action is conceived. Danish policy emphasises limits to opportunities for energy efficient retrofit, identifying these with periodic refurbishment of building elements (walls, roofs, etc.). The low frequency of these refurbishments means each building is considered to effectively have just one opportunity for an energy upgrade before the 2050 (or even 2035) target dates (Danish Government, 2014). Indeed, in Denmark's EUPBD cost-optimality report, limited opportunities are used to justify lowering the discount rate for sensitivity analyses:

In some cases the discount rate also includes a “safety” factor based on the viewpoint: It is more safe to delay the investment and see how the situation and solutions develops than to invest now. This is a good approach in most cases where the investment can be done at any time later — but it is not a good solution in case of adding energy efficiency to a building only being constructed or renovated one-off. (Danish Buildings Research Institute, 2013, 42)

Danish policy discourse thus stresses the importance of ensuring near-term renovation is “future-proofed” for long term energy efficiency requirements (Danish Government, 2014). Similarly, German long-range scenarios for energy efficiency have been translated into pressure for near-term action. The German Energy

⁹Demand reduction is expressed as per capita energy saving from a 2007 baseline.

Agency (DENA) calculated that between 2005 and 2008, the measure-weighted rate at which the building stock was being renovated was 0.8%/year. This figure was regarded too low, with 2%/year being identified as necessary to meet overarching targets (DENA, 2015, 112). Furthermore, policy makers describe near-term changes to the building stock in terms of their long-term impact:

the goals we have in Germany means there's no space for surplus [energy demand] of new buildings. If you consider, for example, now we have 0.5% of building stock built as new building each year. So within the next 40 years that velocity will have like 20% of building stock coming on plus. Of course they're a lot better than old buildings but if they are three times better it is a surplus of 5, 6, 7% extra. And there's no space for these 5, 6, 7% on top of 0% surplus. (Interview: German Energy Efficiency Federal Policy Officer 1, 2015)

By contrast, the translation of long-term goals into near-term objectives in the UK is more complex. The opportunity costs of taking action too early are considered relevant to policy (though this doesn't form a defined trajectory for energy efficiency):

this is true across the whole of the sort of carbon budgeting frameworks, [...] if you're looking to achieve improvements in the most cost effective way, simply saying that you need to do however many hundred thousand or million homes a year [...] is one way of modelling it. There might be reason to believe actually that costs will fall, and therefore in fact you will reduce your costs if you wait to carry out certain types of activities. [...] there might be a better sense in tackling some of the cheaper things earlier, and leaving some of the costlier things until later. (UK Government Senior Energy Policy Officer, 2016)

In Doganova and Karnøe's (2015) terms, Danish and German policy discourses *juxtapose* the costs of tightening energy efficiency standards with imperatives to make progress toward lower energy demand in buildings. In the UK, lowering energy demand is considered a value to be weighed with a *multiplicity* of other values to achieve an overarching economic optimum. This difference corresponds to different policy approaches, exemplified particularly by German domestic approach to calculating energy efficiency standards. German legislation requires that energy efficiency requirements are "economically viable" from the

building occupant's (i.e. microeconomic) perspective.¹⁰

To enforce something like this, the politicians decided that [it would be possible] only if we can [...] show by example to people that [...] at the end [the requirements are] to the benefit of most people, and it is to their personal [...] financial gain to obey them. (German Energy Efficiency Federal Policy Officer 2, 2015.)

Against this backdrop we can make sense of the differences between the UK's approach to calculating cost-optimality for the EPBD and Denmark and Germany's. Where domestic policy identifies near-term imperatives achieve very high levels of energy efficiency, the meaning of "cost-optimal" can be unpacked as legitimating the costs of energy efficiency to the building owners/purchasers who pay for them. Hence a microeconomic perspective is considered appropriate, and policy makers have an interest in exploring how far energy efficiency can be pushed within the bounds of cost-optimal calculations. In UK policy pressures for energy efficiency over the near and long terms are construed in more diffuse terms and objectives are more ambiguous. In this context the meaning of "cost-optimal" can be unpacked as seeking a balance between energy efficiency and other objectives, and the UK's default approach to judging policy in terms of opportunity costs leads to the macroeconomic approach. As energy efficiency is thus constructed in policy as (just) another value against which to weigh others, sensitivity analysis exposes a range of "reasonable" variable values rather than focusing only on those that would justify higher energy performance standards.

5 Conclusion

Differences between the EPBD cost optimality approaches reviewed here can be understood as reflecting different *evaluation cultures* (MacKenzie and Spears, 2014): energy efficiency holds a different ontological position in different countries, and analyses drew on extant policy conventions that vary across countries (and into which analysts have arguably been socialised through training, explicit guidance documents and the need to communicate with colleagues who also use those conventions). My argument is not that national governments gerrymandered their calculations to ensure their outcome minimised the gap between "cost optimal" levels and existing regulation. The compatibility between extant policy

¹⁰This is operationalised as the discounted payback period being less than 20 years.

objectives and the outcome of cost-optimality calculations can be understood instead as mediated by broader conventions that shape the form and meaning of calculative practices.

These observations illustrate the possibility for diversity in financialised policy making in Chiapello's (2014) terms. Calculation of Net Present Value (one of Chiapello's three characteristic approaches to financialised valuation) leaves open scope for consequential differences of approach. In addition to her call for consideration of "contrary and alternative currents" to financialisation, we should also consider alternatives *within* a financialised approach to open space for critical engagement with policy development.

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